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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,085	04/02/2004	Patrick W. Hale	975-135	2142

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MEMBRANE TECHNOLOGY AND RESEARCH INC.  
1360 WILLOW ROAD SUITE 103  
MENLO PARK, CA 94025-1516

EXAMINER
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BUSHEY, CHARLES S

ART UNIT	PAPER NUMBER
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1724

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/24/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/817,085

Applicant(s)

HALE ET AL.

Examiner

Scott Bushey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-62 is/are pending in the application.
- 4a) Of the above claim(s) 7,8,14-16,18,23,25-35 and 46-56 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6,9-13,17,19-22,24,36-45 and 57-62 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. This application contains claims 7, 8, 14-16, 18, 23, 25-35, and 46-56 drawn to a species of the invention nonelected with traverse in the paper filed June 15, 2006. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.
2. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-6, 9-12, 17, 19-22, 24, 36-44, and 57-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Intille taken together with Robb.

Intille (The figure; col. 1, lines 5-44; col. 2, lines 1-7, 57-61; col. 3, lines 22-29, 39-44; col. 4, line 49 through col. 9, line 12) substantially discloses applicant's invention as recited by instant claims 1-6, 9-12, 17, 19-22, 24, 36-44, and 57-60, except for the specific process limitations of instant claims 5, 9-12, 38-41, and 44, as well as the specific disposition of the separated helium stream regarding its storage, sale, or transport to a separate helium separation facility, as recited by various dependent claims and new independent claim 58. Applicant should specifically note that although the Intille reference disclosure is primarily directed to the discussion of separation of hydrogen from a hydrocarbon gas mixture, the reference is clearly intended to also apply fully to the separation of helium from helium containing natural gas compositions (see col. 1, lines 24-27). The Intille reference further suggests use of multiple pressure swing adsorption units or molecular sieves to separate the gas mixture upstream of the membrane separators. Downstream of the membrane separators the non-permeated stream is disposed of by flaring, venting or as an auxiliary fuel gas within the process.

Robb (Figs. 1-4; col. 1, lines 13-15, 25-31; col. 4, lines 54-75; col. 5, lines 45-51, 69-75; col. 6, lines 4-7, 13-16, 52-55, 59-60, 65-75; col. 7, lines 19-21, 27-58; col. 9, lines 19-22) as applied previously is specifically directed to the separation and storage or sale of high purity streams of helium gas. The reference clearly discloses the specific

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process limitations of instant claims 5, 9-12, 38-41, and 44, as will be noted at the cited portions of the reference. Whereas Robb teaches membrane means for provided a highly purified helium stream, it would have been obvious for an artisan at the time of the invention, to substitute the membrane separation means and methods as taught by Robb, for those as disclosed by Intille in combination with the multiple non-membrane separation steps as utilized by Intille, since such would facilitate not only the production of a highly purified helium stream, but also highly purified component streams obtainable from the original gas mixture. Furthermore, in view of the teaching by Intille, it would have been obvious for an artisan at the time of the invention, to burn the non-permeated gas stream as a fuel gas within the process at any desired location.

6. Claims 13 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over the reference combination as applied to claims 1-6, 9-12, 17, 19-22, 24, 36-44, and 57-60 above, and further in view of Nemser et al.

The reference combination as applied to claims 1-6, 9-12, 17, 19-22, 24, 36-44, and 57-60 above substantially discloses applicant's invention as recited by instant claims 13 and 45, except for the membranes being made from any one of fluorinated dioxoles, fluorinated dioxolanes, and fluorinated cyclically polymerizable alkyl ethers.

Nemser et al (col. 3, line 14; col. 6, lines 45-50) discloses the specific use of fluorinated dioxoles for the material of the membrane to facilitate separation of helium from either nitrogen or methane. It would have been obvious for an artisan at the time of the invention, to substitute the fluorinated dioxole material for the membrane of the primary reference combination as applied to claims 1-6, 9-12, 17, 19-22, 24, 36-44, and

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57-60 above, in view of the teaching by Nemser et al, since such are well known to provide a high permeability preference for helium over either nitrogen or methane.

7. Claims 61 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over the reference combination as applied to claims 13 and 45 above, and further in view of Pinnau et al '929.

The reference combination as applied to claims 13 and 45 above substantially discloses applicant's invention as recited by instant claims 61 and 62, except for the fluorinated dioxoles thereof having a fractional free volume of less than about 0.3.

Pinnau et al '929 ([0044], [0049], [0068], [0071], [0165], [0167], [0168], and the last five lines of [0169]) teaches that it is advantageous to utilize fluorinated dioxoles having a fractional free volume of less than about 0.3. It would have been obvious for an artisan at the time of the invention, to modify the fluorinated dioxoles as suggested by the Nemser et al reference of the combination of references as applied to claims 13 and 45 above, to have a fractional free volume of less than about 0.3, since such has been determined to maintain its selectivity for the desired compound over a greatly period than fluorinated dioxoles having a fractional free volumes of greater than about 0.3, as suggested by the combination of references as applied to claims 13 and 45 above.

### ***Response to Arguments***

8. Applicant's arguments with respect to claims 1-6, 9-13, 17, 19-22, 24, 36-45, and 57-62 have been considered but are moot in view of the new grounds of rejection, which

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were necessitated by the amendments to claims submitted by applicant on November 27, 2006.

### ***Conclusion***

9. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott Bushey whose telephone number is 571 272-1153. The examiner can normally be reached on M-Th 6:30-5:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571 272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Scott Bushey  
Primary Examiner  
Art Unit 1724

csb  
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